

POECILOSTOME COPEPODS (CYCLOPOIDA, LICHOMOLGIDAE)
FROM THE ALCYONACEAN *LOBOPHYTUM CRASSUM*
IN THE MOLUCCAS

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ABSTRACT

Three lichomolgid copepods are associated with the soft coral *Lobophytum crassum* in the Moluccas. *Anisomolgus limbatus* new species is characterized by the lamelliform fringe on the second segment of the second antenna of the male. *Panjakus auriculatus* new species is notable in possessing earlike epimera on the segment of leg 4 in the female. *Paramolgus inconstans* new species may be recognized by the elongate caudal ramus and the shape of the genital segment in the female. *Anisomolgus insolens*, a species already known from Madagascar, occurs also on this soft coral.

Until now only one species of copepod, *Anisomolgus insolens* (Humes and Ho, 1968), has been reported to be associated with *Lobophytum crassum* Von Marenzeller, a soft coral widely distributed in the Indo-Pacific. This copepod occurs in Madagascar (Humes and Ho, 1968) and New Caledonia (Humes, 1975). In this paper three new copepods as well as *A. insolens* are reported from *Lobophytum crassum* in the Moluccas.

Since the colonies of *Lobophytum crassum* with which the copepods occurred were too large to be examined conveniently, fragments about 20 cm in diameter were broken off and isolated in plastic bags. Later these fragments were torn into small pieces in sea water with about 5% ethyl alcohol and gently washed. The water was put through a fine net and the copepods recovered from the sediment retained.

The observations and measurements were made on specimens cleared in lactic acid. All figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. The abbreviations used are: A_1 = first antenna, A_2 = second antenna, L = labrum, MXPD = maxilliped, and P_1 = leg 1.

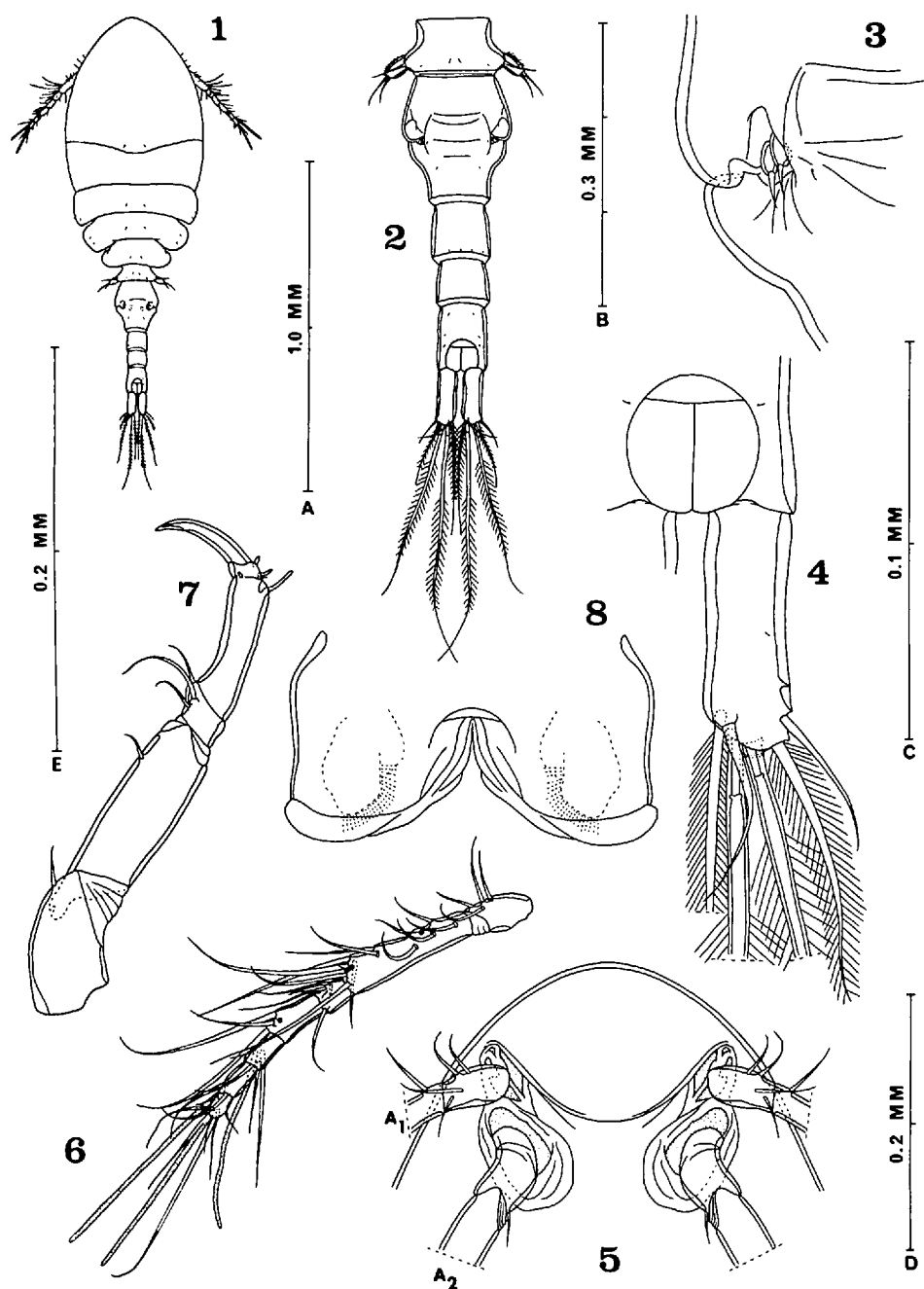
Family Lichomolgidae Kossman, 1877
Genus *Anisomolgus* Humes and Stock, 1972
Anisomolgus insolens (Humes and Ho, 1968)

Specimens collected.—15 ♀♀, 18 ♂♂ from a fragment of one colony of *Lobophytum crassum* Von Marenzeller, in 2 m, southern shore of Goenoeng Api, Banda Islands, 4°32'05"S, 129°52'30"E, 26 April 1975.

Remarks.—This species, originally described from *Lobophytum crassum* in Madagascar, has been recorded from *L. crassum* and *Lobophytum crebriplicatum* Von Marenzeller in New Caledonia (Humes, 1975), and from *Lobophytum pauciflorum* (Ehrenberg) at Eniwetok Atoll (Humes, 1973).

Anisomolgus limbatus new species
Figures 1-27

Type material.—8 ♀♀, 6 ♂♂ from a fragment of one colony of *Lobophytum crassum* Von Marenzeller, in 3 m, Poelau Marsegoe, western Ceram, 2°59'30"S, 128°03'30"E, 15 May 1975. Holotype ♀ (USNM 171362), allotype (USNM 171363), and 6 paratypes (3 ♀♀, 3 ♂♂) (USNM 171364) deposited



Figures 1–8. *Anisomolgus limbatus*, n. sp., female: 1, dorsal (scale A); 2, urosome, dorsal (B); 3, genital area, dorsal (C); 4, caudal ramus, dorsal (C); 5, rostrum, ventral (D); 6, first antenna, dorsal (D); 7, second antenna, posterior (E); 8, labrum, with position of paragnaths indicated by broken lines, ventral (C).

in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female.—Body (Fig. 1) moderately slender. Length (not including setae on caudal rami) 1.08 mm (0.99–1.16 mm) and greatest width 0.39 mm (0.37–0.41 mm), based on eight specimens in lactic acid. Ratio of length to width of prosome 1.78:1. Ratio of length of prosome to that of urosome 1.64:1.

Segment of leg 5 (Fig. 2) $49 \times 108 \mu\text{m}$. Genital segment $135 \times 116 \mu\text{m}$, longer than wide, moderately expanded in midregion. Genital areas located dorsolaterally near middle of segment. Each area (Fig. 3) bearing two naked setae $7 \mu\text{m}$ and $6 \mu\text{m}$. Three postgenital segments from anterior to posterior 59×59 , 46×54 , and $68 \times 51 \mu\text{m}$. Anal segment with smooth posteroventral margin.

Caudal ramus (Fig. 4) moderately elongate, $57 \times 22 \mu\text{m}$, ratio 2.63:1. Outer lateral seta $38 \mu\text{m}$ and dorsal seta $48 \mu\text{m}$, both naked. Outermost terminal seta $76 \mu\text{m}$, innermost terminal seta $135 \mu\text{m}$, and two long median terminal setae $194 \mu\text{m}$ (outer) and $270 \mu\text{m}$ (inner), both inserted between smooth dorsal flange and ventral flange with a marginal row of minute spinules. All four terminal setae feathered.

Body surface with few small hairs (sensilla) as in Figure 1.

Egg sac unknown.

Rostrum (Fig. 5) broad. First antenna (Fig. 6) $303 \mu\text{m}$ long. Lengths of its seven segments (measured along their posterior nonsetiferous margins): 28 ($55 \mu\text{m}$ along anterior margin), 108, 23, 41, 30, 26, and $20 \mu\text{m}$, respectively. Formula for armature: 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked. Second antenna (Fig. 7) 4-segmented. Formula: 1, 1, 3, and one claw plus five small setules. Fourth segment $76 \mu\text{m}$ along outer side, $59 \mu\text{m}$ along inner side, and $19 \mu\text{m}$ wide.

Labrum (Fig. 8) with two slightly divergent posteroventral lobes. Mandible (Fig. 9), paragnath (Fig. 8), first maxilla (Fig. 10), and second maxilla (Fig. 11) resembling in major respects those of *Anisomolgus protentus* (Humes and Frost, 1964). Maxilliped (Fig. 12) with second segment bearing two very unequal setae; third segment (Fig. 13) having one spine with minute barbules along one side and one small seta, and terminating in a peculiar bent spiniform process.

Ventral area between maxillipeds and first pair of legs (Fig. 14) not protuberant.

Legs 1–4 (Figs. 15–18) segmented and armed as in *Anisomolgus protentus*. Leg 4 with inner coxal seta $11 \mu\text{m}$ long with minute barbs. Exopod $86 \mu\text{m}$ long. Endopod with first segment $32 \mu\text{m}$ long including spiniform process ($30 \mu\text{m}$ without this process) and $16 \mu\text{m}$ in greatest width. Second endopod segment $76 \mu\text{m}$ long with spiniform process, $70 \mu\text{m}$ without process, and $12 \mu\text{m}$ in greatest width. Terminal barbed endopod spine $44 \mu\text{m}$ and spiniform seta $13 \mu\text{m}$ with few extremely small barbules.

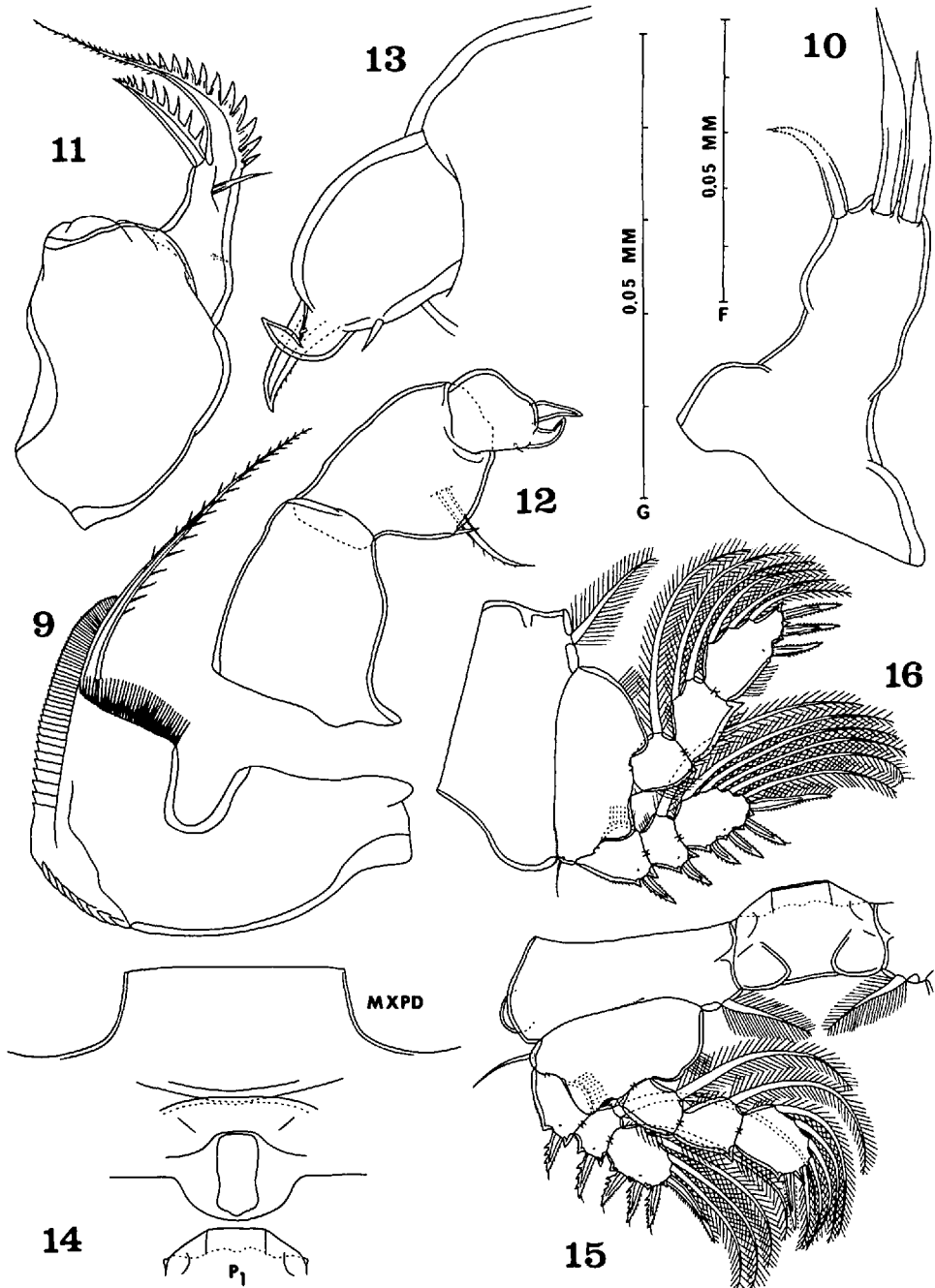
Leg 5 (Fig. 19) with free segment $32 \times 16 \mu\text{m}$, bearing two terminal setae $35 \mu\text{m}$ and $28 \mu\text{m}$. Dorsal seta $44 \mu\text{m}$. All setae naked. Free segment ornamented along outer surface with small spines.

Leg 6 represented by two setae on genital area (Fig. 3).

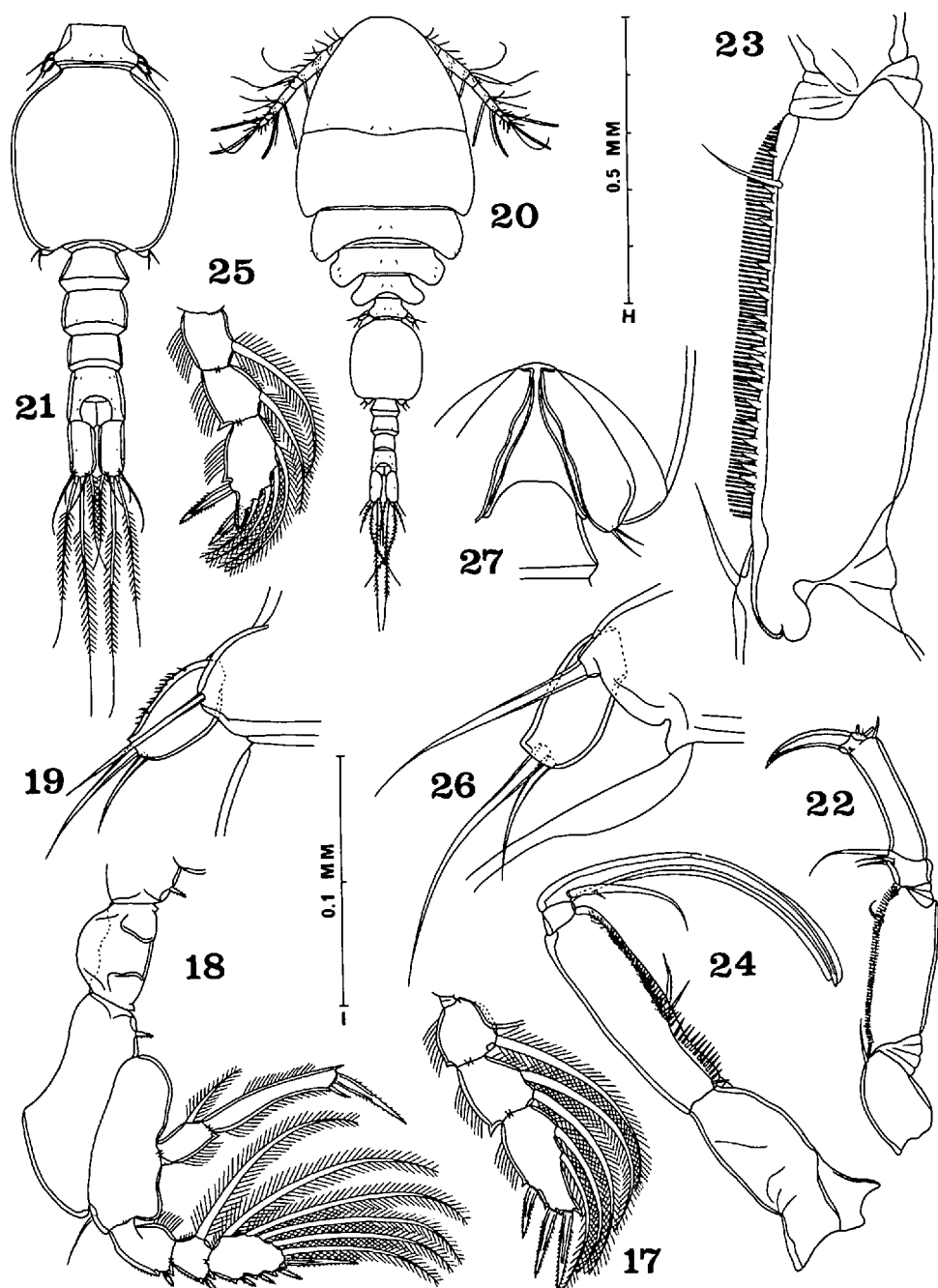
Color of living specimens in transmitted light opaque gray, eye red.

Male.—Body (Fig. 20) resembling in general form that of female. Length (excluding setae on caudal rami) 0.81 mm (0.79 – 0.84 mm) and greatest width 0.26 mm (0.25 – 0.29 mm), based on six specimens in lactic acid. Ratio of length to width of prosome 1.56:1. Ratio of length of prosome to that of urosome 1.37:1.

Segment of leg 5 (Fig. 21) $32 \times 70 \mu\text{m}$. Genital segment $146 \times 130 \mu\text{m}$, slightly



Figures 9–16. *Anisomolgus limbatus*, n. sp., female: 9, mandible, posterior (scale F); 10, first maxilla, anterior (G); 11, second maxilla, posterior (C); 12, maxilliped, anterior (C); 13, third segment of maxilliped, outer (G); 14, area between maxillipeds and first pair of legs, ventral (E); 15, leg 1 and intercoxal plate, anterior (E); 16, leg 2, anterior (E).



Figures 17-27. *Anisomolgus limbatus*, n. sp. Female: 17, endopod of leg 3, anterior (scale E); 18, leg 4 and intercoxal plate, anterior (E); 19, leg 5, dorsal (C). Male: 20, dorsal (H); 21, urosome, dorsal (D); 22, second antenna, posterior (E); 23, second segment of second antenna, anterior (F); 24, maxilliped, outer (E); 25, endopod of leg 1, anterior (I); 26, leg 5, dorsal (G); 27, leg 6, ventral (I).

longer than wide. Four postgenital segments from anterior to posterior 30×57 , 35×46 , 27×41 , and $41 \times 46 \mu\text{m}$.

Caudal ramus resembling that of female but smaller, $46 \times 22 \mu\text{m}$, ratio 2.13:1.

Body surface ornamented with hairs as in female.

Rostrum as in female. First antenna like that of female but three aesthetes added (at points indicated by dots in Figure 6). Second antenna (Fig. 22) with inner side of second segment having row of spines and lamelliform fringe of closely spaced slender spinules (Fig. 23).

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (Fig. 24) with two setae (one smooth, other with minute hairs) and two rows of slender spines. Claw $157 \mu\text{m}$ along its axis with long narrow terminal lamella and bearing two very unequal smooth setae proximally.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 like those of female except for endopod of leg 1 (Fig. 25) where formula is I, I, 4 instead of I, 5 as in female. Spiniform process at base of terminal spine enlarged and spinulated as in other species of *Anisomolgus*.

Leg 5 (Fig. 26) with unornamented free segment $16 \times 8 \mu\text{m}$, its terminal setae $30 \mu\text{m}$ and approximately $12 \mu\text{m}$. Dorsal seta $26 \mu\text{m}$.

Leg 6 (Fig. 27) a posteroventral flap on genital segment bearing two naked setae about $14 \mu\text{m}$ long.

Spermatophore unknown.

Color in living specimens as in female.

Etymology.—The specific name *limbatus*, Latin meaning bordered or edged, refers to the lamelliform fringe on the second segment of the second antenna of the male.

Comparison with Other Species of *Anisomolgus*.—Four species are presently recognized in the genus *Anisomolgus*. From these *Anisomolgus limbatus* differs in significant respects. In the female of *Anisomolgus spinipes* (Sewell, 1949) the caudal ramus is broader than long and the genital segment is strongly indented posteriorly. In *Anisomolgus protentus* (Humes and Frost, 1964) the genital segment of the female is much expanded in its midregion and distinctly wider than long, and the second segment of the second antenna of the male bears rows of small spines. In *Anisomolgus insolens* (Humes and Ho, 1968) the first toothlike spine on the lash of the second maxilla is enlarged, the free segment of leg 5 in the female is unornamented, and the concave surface of the claw of the maxilliped in the male has small hyaline knobs. In *Anisomolgus incisus* (Humes and Ho, 1968) the free segment of leg 5 in the female is unornamented and the second segment of the second antenna of the male has a notched lamella.

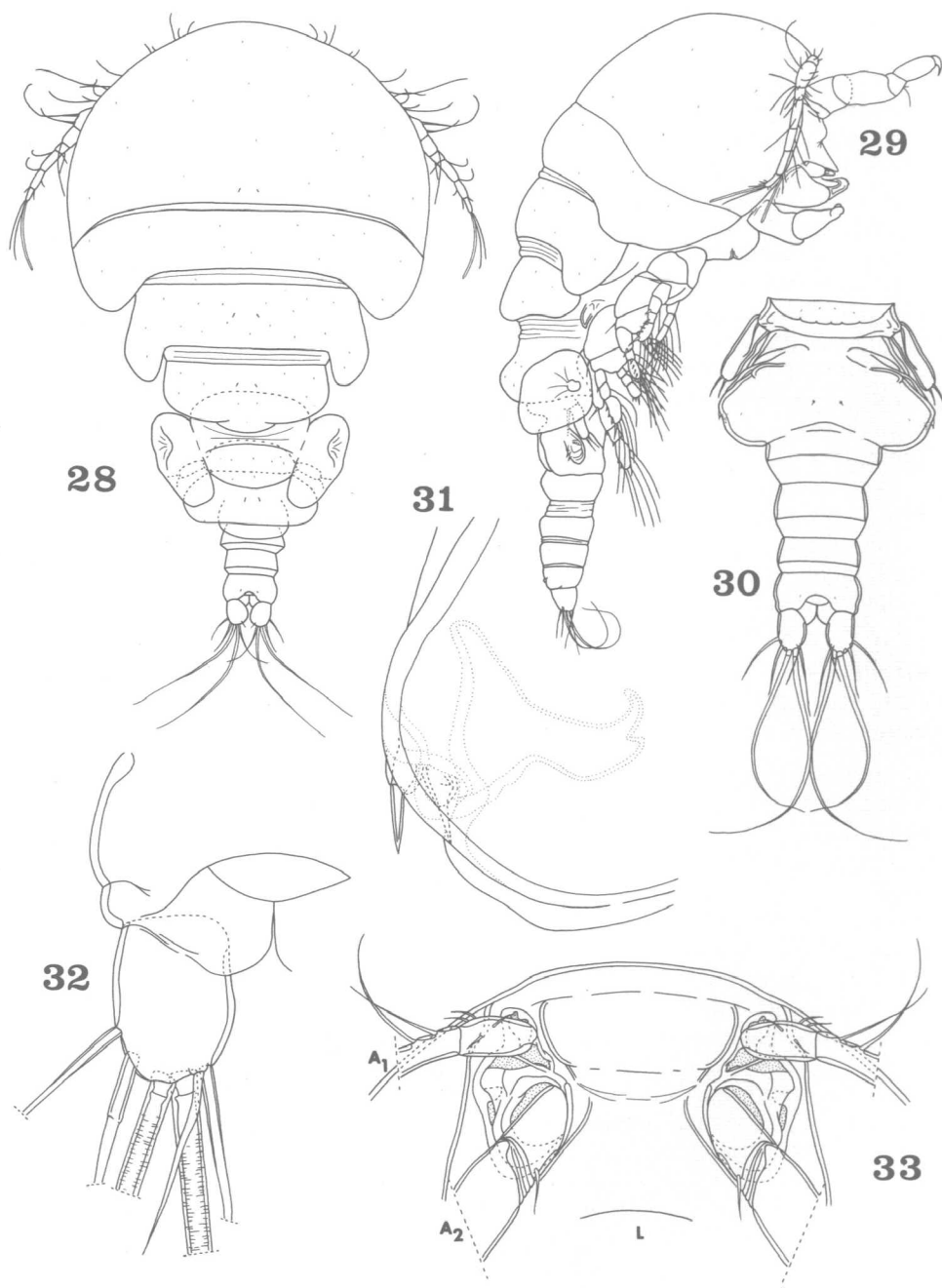
One of the principal features of *Anisomolgus* is the presence on the second segment of the endopod of leg 4 of a terminal spine and a seta. In the new species this seta is a little less attenuated than in other species and has a slightly spinelike appearance. However, we interpret the armature of this segment as I, I. On this basis and in view of the possession by the new species of many characteristics of its conspecifics (for example, details of the mouthparts and legs 1–4) we have placed the new Moluccan form in the genus *Anisomolgus*.

Genus *Panjakus* Humes and Stock, 1972

Panjakus auriculatus new species

Figures 28–54

Type material.—14 ♀♀, 17 ♂♂, and 7 copepodids from part of one colony of the alcyonacean coral *Lobophytum crassum* Von Marenzeller, in 3 m, Poelau Marsegoe, western Ceram, 2°59'30"S,



Figures 28–33. *Panjakus auriculatus*, n. sp., female: 28, dorsal (scale H); 29, lateral (H); 30, urosome, dorsal (B); 31, genital area, dorsal (F); 32, caudal ramus, dorsal (C); 33, rostrum, ventral (D).

128°03'30"E, 15 May 1975. Holotype ♀ (USNM 171356), allotype (USNM 171357), and 21 paratypes (8 ♀♀, 13 ♂♂) (USNM 171358) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes and the copepodids in the collection of the first author.

Female.—Body (Figs. 28, 29) with broad prosome, moderately thick dorsoventrally. Length (not including setae on caudal rami) 1.03 mm (0.98–1.08 mm) and greatest width 0.61 mm (0.59–0.63 mm), based on 10 specimens in lactic acid. Epimera of segments bearing legs 1 and 2 lobate posteriorly, those of segment of leg 3 without lobes, and those of segment of leg 4 forming large lateral auricular lobes (Figs. 28, 29, 54). Ratio of length to width of prosome 1.28:1. Ratio of length of prosome to that of urosome 2.51:1.

Segment of leg 5 (Fig. 30) $41 \times 157 \mu\text{m}$, in dorsal view concealed under tergum of segment of leg 4 (Fig. 28). Genital segment $162 \times 227 \mu\text{m}$, much wider than long, in dorsal view widest at midregion and abruptly narrowed ($124 \mu\text{m}$) in posterior third. Genital areas located laterally at widest part of segment. Each area (Fig. 31) with two small naked setae $12 \mu\text{m}$ and $7 \mu\text{m}$ and a small knob. Three postgenital segments from anterior to posterior 54×100 , 35×89 , and $51 \times 92 \mu\text{m}$. Anal segment with smooth posteroventral border.

Caudal ramus (Fig. 32) short, $38 \times 30 \mu\text{m}$, ratio 1.27:1. Outer lateral seta $61 \mu\text{m}$, dorsal seta $44 \mu\text{m}$, outermost terminal seta $57 \mu\text{m}$, innermost terminal seta $74 \mu\text{m}$, and two long median terminal setae $88 \mu\text{m}$ (outer) and $110 \mu\text{m}$ (inner). All setae smooth.

Body with minute hairs (sensilla) as in Figure 28.

Egg sac unknown.

Rostrum (Fig. 33) broad and weakly defined.

First antenna (Fig. 34) $365 \mu\text{m}$ long. Lengths of its seven segments (measured along their posterior nonsetiferous margins): 20 ($59 \mu\text{m}$ along anterior margin), 113, 27, 46, 49, 38, and $32 \mu\text{m}$ respectively. Formula for armature as in *Anisomolgus limbatus*. All setae smooth. Second antenna (Fig. 35) $288 \mu\text{m}$ long. Formula: 1, 1, 3, and one claw plus five small setules. Fourth segment $62 \mu\text{m}$ along outer side, $38 \mu\text{m}$ along inner side, and $30 \mu\text{m}$ wide. Claw $57 \mu\text{m}$.

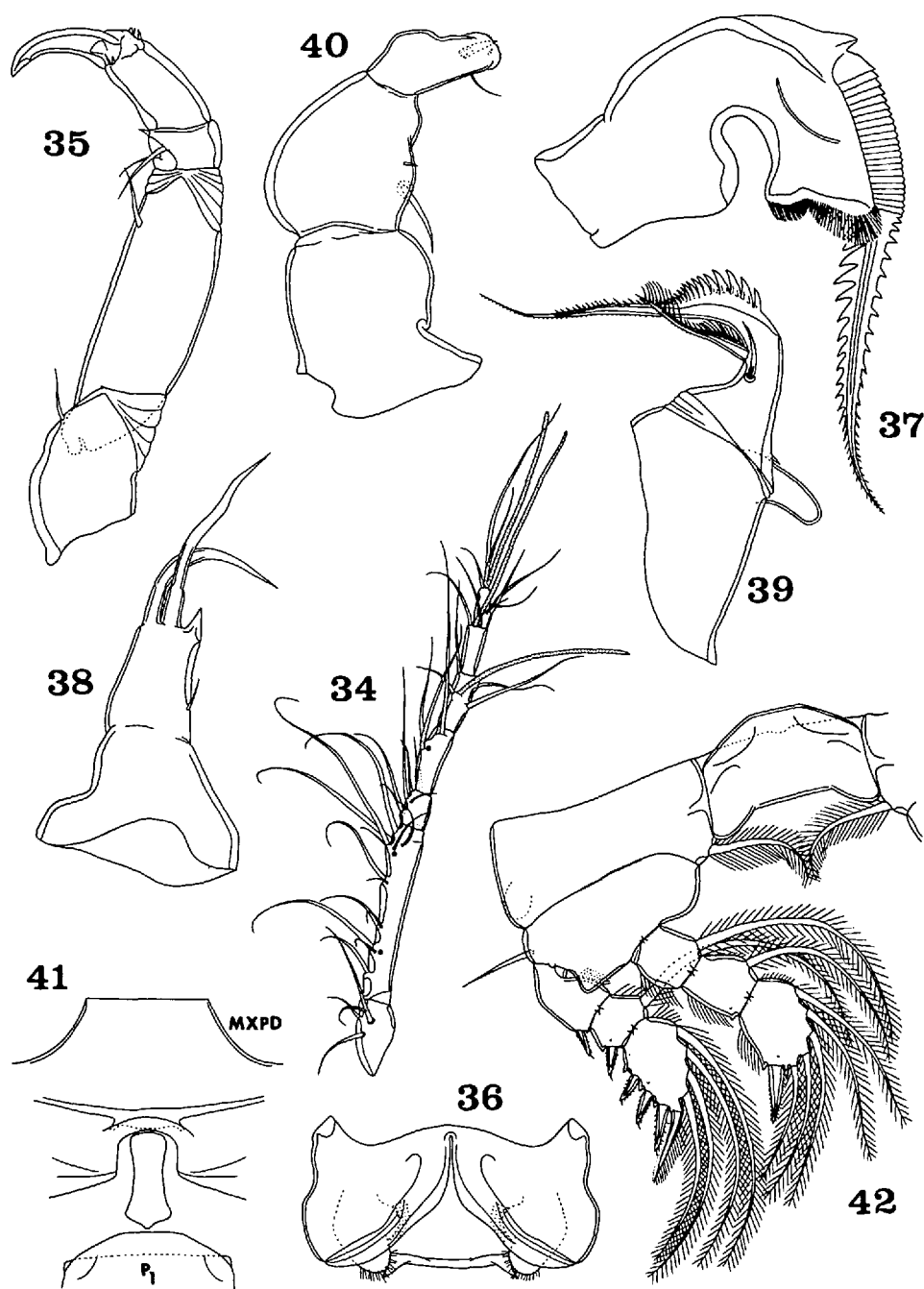
Labrum (Fig. 36) with two divergent lobes. Mandible (Fig. 37) with lash having large proximal teeth grading into small slender spinules distally. Paragnath bilobed and hairy (Fig. 36). First maxilla (Fig. 38) with four elements. Second maxilla (Fig. 39) with first segment having a prominent outer distal digitiform process directed a little proximally. Convex margin of lash with crest of large teeth proximally and two rows of small spinules distally. Maxilliped (Fig. 40) with second segment bearing two unequal setae; minute spinules near insertion of larger seta. Third segment bearing one spine and one seta and having a blunt hyaline tip with a few minute spinules.

Ventral area between maxillipeds and first pair of legs (Fig. 41) protuberant (Fig. 29).

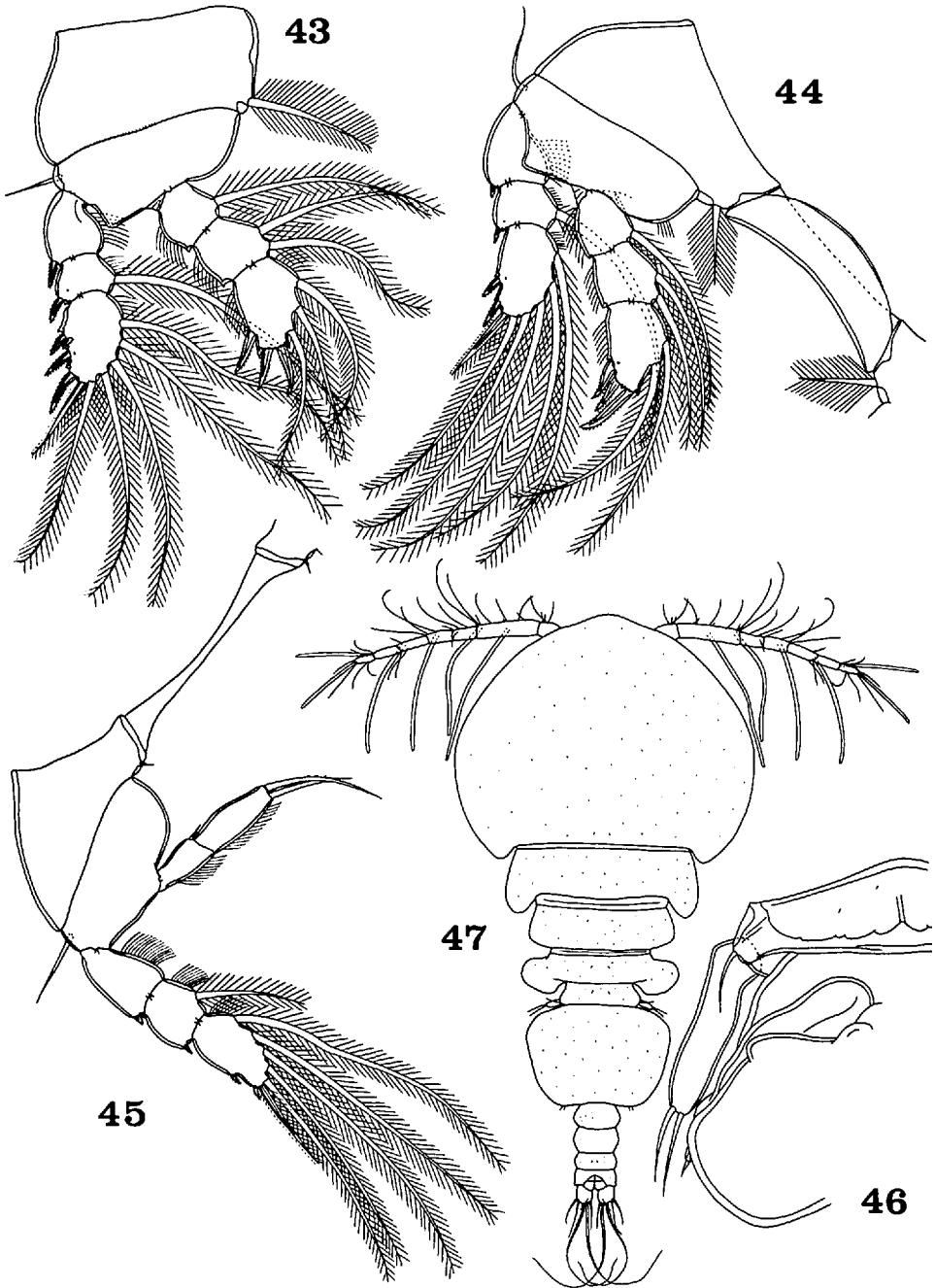
Legs 1–4 (Figs. 42–45) with 3-segmented rami except for 2-segmented endopod of leg 4. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P ₁	coxa	0-1	basis	1-0	exp	I-0;	I-1;	III, I, 4
					enp	0-1;	0-1;	I, 5
P ₂	coxa	0-1	basis	1-0	exp	I-0;	I-1;	III, I, 5
					enp	0-1;	0-2;	I, II, 3
P ₃	coxa	0-1	basis	1-0	exp	I-0;	I-1;	II, I, 5
					enp	0-1;	0-2;	I, II, 2
P ₄	coxa	0-1	basis	1-0	exp	I-0;	I-1;	II, I, 5
					enp	0-1;	II	

Coxa of leg 1 with outer distal lobe on posterior surface (Fig. 42). Third exopod



Figures 34–42. *Panjakus auriculatus*, n. sp., female: 34, first antenna, dorsal (scale D); 35, second antenna, posterior (E); 36, labrum and paragnaths, ventral (I); 37, mandible, posterior (C); 38, first maxilla, anterior (F); 39, second maxilla, posterior (I); 40, maxilliped, antero-inner (I); 41, area between maxillipeds and first pair of legs, ventral (E); 42, leg I and intercoxal plate, anterior (E).



Figures 43–47. *Panjakus auriculatus*, n. sp. Female: 43, leg 2, anterior (scale E); 44, leg 3 and intercoxal plate, anterior (E); 45, leg 4 and intercoxal plate, anterior (E); 46, leg 5, dorsal (E). Male: 47, dorsal (H).

segment of leg 3 unusual in having formula II, I, 5 (Fig. 44) instead of III, I, 5 as in many lichomolgids. Leg 4 (Fig. 45) with exopod $108\ \mu\text{m}$ long, its third segment with II, I, 5. First segment of endopod $29 \times 14\ \mu\text{m}$, its small naked inner distal seta $11\ \mu\text{m}$. Second segment $41 \times 14\ \mu\text{m}$, bearing two terminal setiform spines $42\ \mu\text{m}$ and $56\ \mu\text{m}$. Outer margins of both segments haired. Inner coxal seta minute, $7\ \mu\text{m}$, and naked.

Leg 5 (Fig. 46) with elongate unornamented free segment $86 \times 20\text{--}25\ \mu\text{m}$, width variable. Two terminal setae 37 and $42\ \mu\text{m}$. Dorsal seta $30\ \mu\text{m}$. All setae naked.

Leg 6 represented by two setae on genital area (Fig. 31).

Color in living specimens opaque gray, eye red.

Male.—Body (Fig. 47) in general form similar to that of female. Length $0.99\ \text{mm}$ ($0.91\text{--}1.02\ \text{mm}$) and greatest width $0.50\ \text{mm}$ ($0.47\text{--}0.52\ \text{mm}$), based on 10 specimens in lactic acid. Epimera of segment of leg 4 prominent but less auricular than in female. Ratio of length to width of prosome 1.29:1. Ratio of length of prosome to that of urosome 2.01:1.

Segment of leg 5 (Fig. 48) $41 \times 140\ \mu\text{m}$. Genital segment $200 \times 259\ \mu\text{m}$, wider than long, in dorsal view widest in anterior third. Four postgenital segments from anterior to posterior 49×81 , 43×78 , 32×73 , and $41 \times 70\ \mu\text{m}$.

Caudal ramus $33 \times 28\ \mu\text{m}$, ratio 1.17:1. Setae as in female.

Body with minute hairs (sensilla) as in Figure 47.

Rostrum as in female. First antenna similar to that of female but three long aesthetes added (at points indicated by dots in Figure 34). Second antenna as in female.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (Fig. 49) with second segment having two setae, the shorter one barbed, and rows of slender spines. Claw $216\ \mu\text{m}$ with two unequal naked proximal setae.

Ventral area between maxillipeds and first pair of legs resembling that of female.

Legs 1–4 like those of female except for sexual dimorphism in endopods of legs 1 and 2. Leg 1 with endopod (Fig. 50) $104\ \mu\text{m}$, longer than exopod ($86\ \mu\text{m}$). Third segment with recurved and smooth spine, two small rounded spiniform processes, and five short setae. Leg 2 with endopod (Fig. 51) $109\ \mu\text{m}$, including spiniform process, longer than exopod ($86\ \mu\text{m}$). Third segment with outer distal spiniform process greatly enlarged.

Leg 5 (Fig. 52) with free segment $37 \times 13\ \mu\text{m}$, its terminal setae 36 and $44\ \mu\text{m}$.

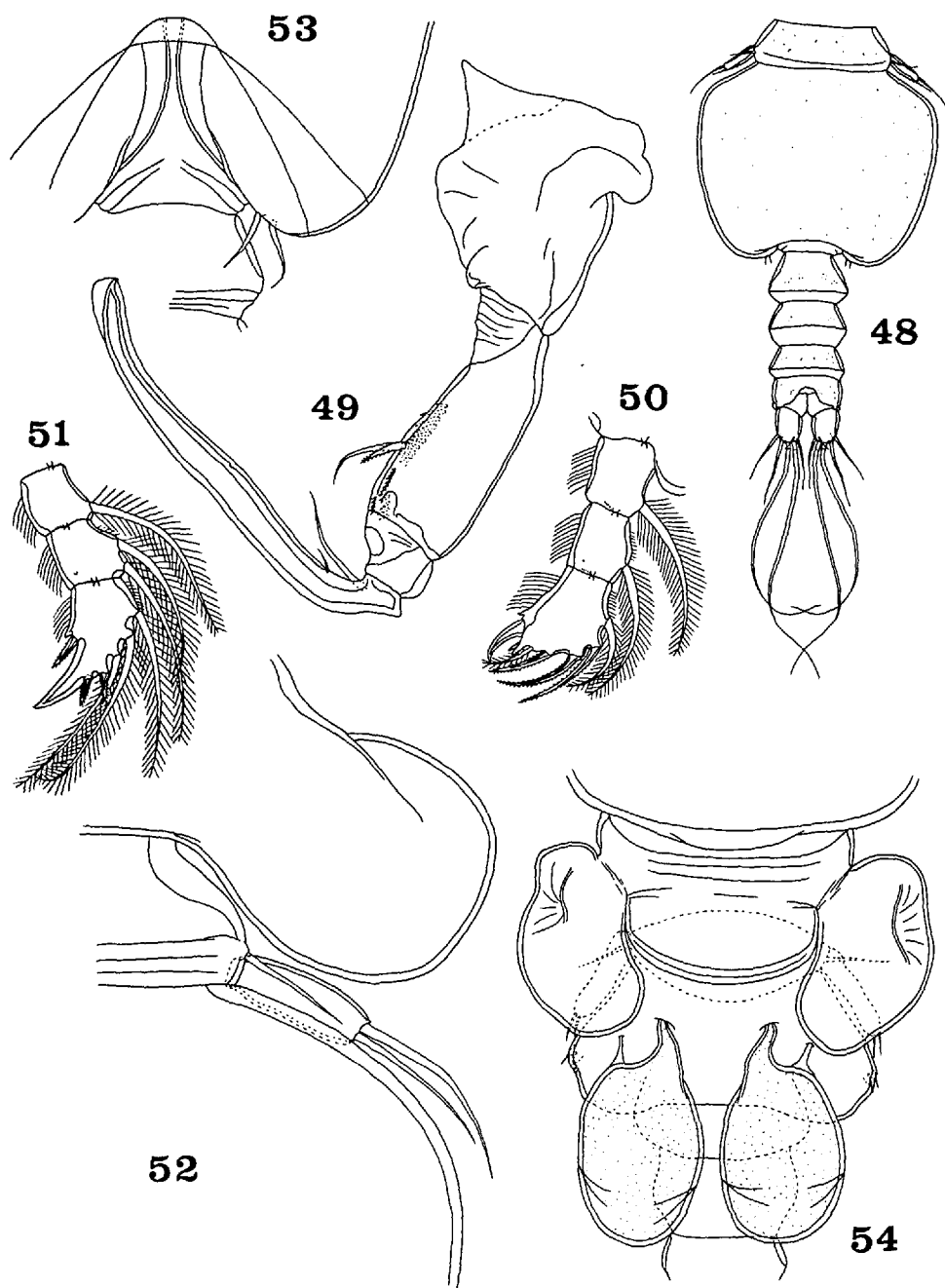
Leg 6 (Fig. 53) a posteroventral flap on genital segment bearing two naked setae approximately $36\ \mu\text{m}$.

Spermatophore (Fig. 54) oval, $130 \times 99\ \mu\text{m}$ not including neck.

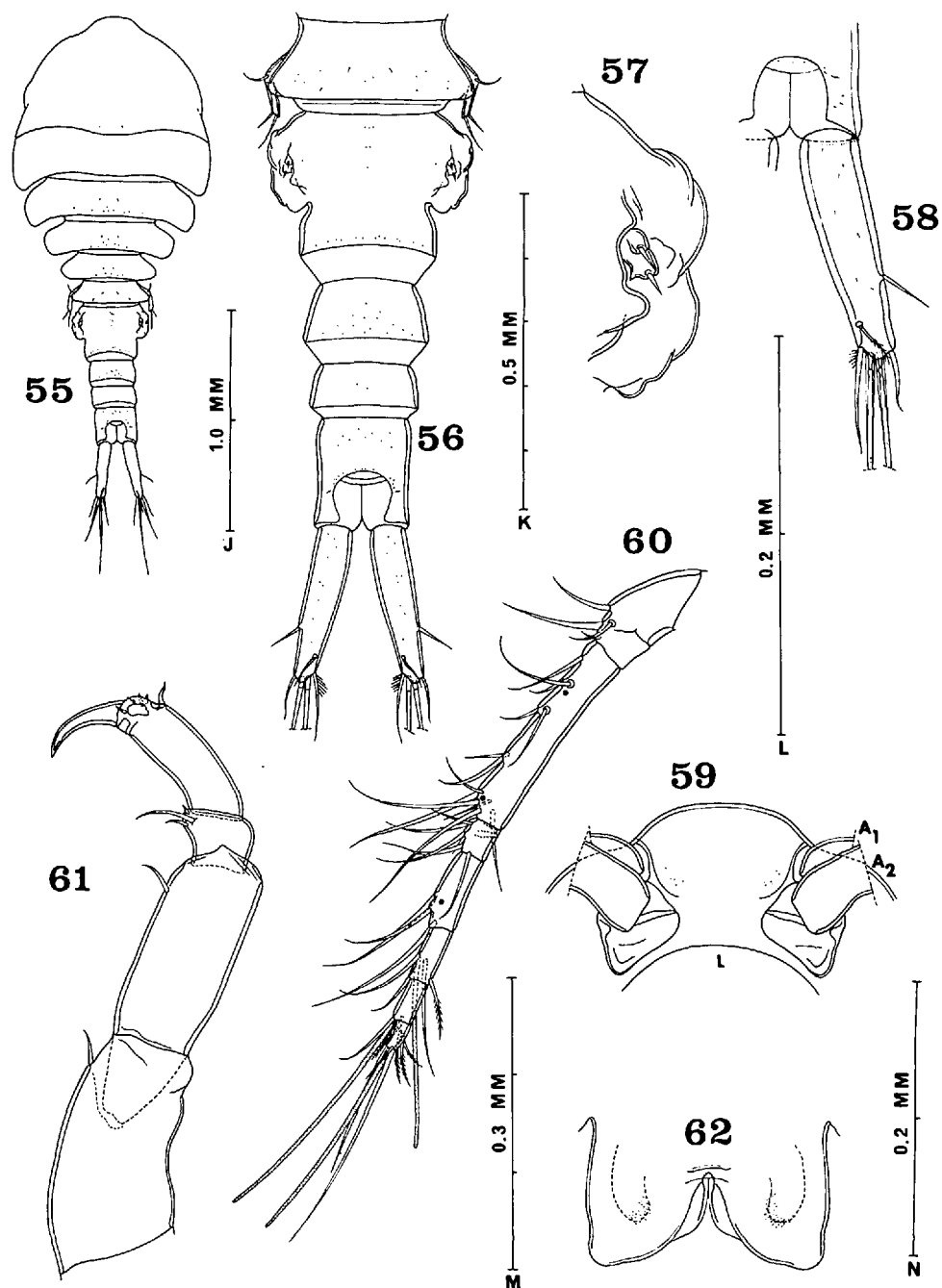
Color in living specimens as in female.

Etymology.—The specific name *auriculatus*, Latin meaning having little ears, alludes to the earlike epimera on the segment of leg 4 in the female.

Comparison with Related Species.—The genus *Panjakus* Humes and Stock, 1972, contains at present two species, *Panjakus hydnophorae* Humes and Stock, 1973, and *Panjakus platygyrae* Humes and Stock, 1973. *Panjakus auriculatus* differs from these in several features: (1) the auricular epimera on the segment of leg 4 in the female, (2) the formula II, I, 5 on the third exopod segment of leg 3, (3) the digitiform process on the first segment of the second maxilla being directed a little proximally rather than distally, (4) the endopod of leg 4 with a very small naked inner seta on the first segment and two setiform spines on the second



Figures 48–54. *Panjakus auriculatus*, n. sp., male: 48, urosome, dorsal (scale B); 49, maxilliped, outer (E); 50, endopod of leg 1, anterior (E); 51, endopod of leg 2, anterior (E); 52, leg 5, dorsal (C); 53, leg 6, ventral (E); 54, spermatophores (stippled) attached to genital segment of female, dorsal (D).



Figures 55–62. *Paramolgus inconstans*, n. sp., female: 55, dorsal (scale J); 56, urosome, dorsal (K); 57, genital area, dorsal (L); 58, caudal ramus, dorsal (M); 59, rostrum, ventral (K); 60, first antenna, dorsal (M); 61, second antenna, postero-inner (N); 62, labrum, with position of paragnaths indicated by broken lines, ventral (L).

segment, and (5) the short caudal ramus, in the female the ratio of length to width 1.27:1.

Genus *Paramolgus* Humes and Stock, 1972

Paramolgus inconstans new species

Figures 55–80

Type material.—3 ♀♀, 4 ♂♂, and 1 copepodid from one colony of the alcyonacean *Lobophytum crassum* Von Marenzeller, in 2 m, southern shore of Goenoeng Api, Banda Islands, 4°32'05"S, 129°52'30"E, 26 April 1975. Holotype ♀ (USNM 171359), allotype (USNM 171360), and 3 paratypes (1 ♀, 2 ♂♂) (USNM 171361) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) and the copepodid in the collection of the first author.

Female.—Body (Fig. 55) with slightly broadened prosome indented laterally at level of mouthparts. Length (not including setae on caudal rami) 2.23 mm (2.13–2.32 mm) and greatest width 0.87 mm (0.85–0.90 mm), based on three specimens in lactic acid. Segment of leg 1 separated from head. Ratio of length to width of prosome 1.31:1. Ratio of length of prosome to that of urosome 1.17:1.

Segment of leg 5 (Fig. 56) $125 \times 320 \mu\text{m}$. Genital segment $255 \times 320 \mu\text{m}$, wider than long, in dorsal view anterior part expanded with irregular margins, posterior part not expanded ($220 \mu\text{m}$ wide) with smooth margins. Genital areas situated dorsolaterally on expanded portion of segment. Each area (Fig. 57) with two small setae about $12 \mu\text{m}$ and a small spiniform process. Three postgenital segments from anterior to posterior $117 \times 185 \mu\text{m}$, $83 \times 161 \mu\text{m}$, and $172 \times 148 \mu\text{m}$. Posteroventral border of anal segment (Fig. 58) with row of extremely small spinules on both sides.

Caudal ramus (Fig. 58) elongate, $247 \times 55 \mu\text{m}$ (width taken at midregion), ratio of length to width 4.49:1. Outer lateral seta $43 \mu\text{m}$ and smooth. Dorsal seta $44 \mu\text{m}$ and delicately haired. Outermost terminal seta $57 \mu\text{m}$ and smooth. Innermost terminal seta $78 \mu\text{m}$ with short proximal inner row of hairs. Two long median smooth terminal setae $185 \mu\text{m}$ (outer) and $310 \mu\text{m}$ (inner), both inserted between smooth dorsal and ventral flanges. Each terminal seta with axial row of minute refractile points.

Dorsal surface of body with few hairs (sensilla) and refractile points (Fig. 55).

Complete egg sac not seen. Eggs in fragment of sac about $55 \mu\text{m}$ in diameter.

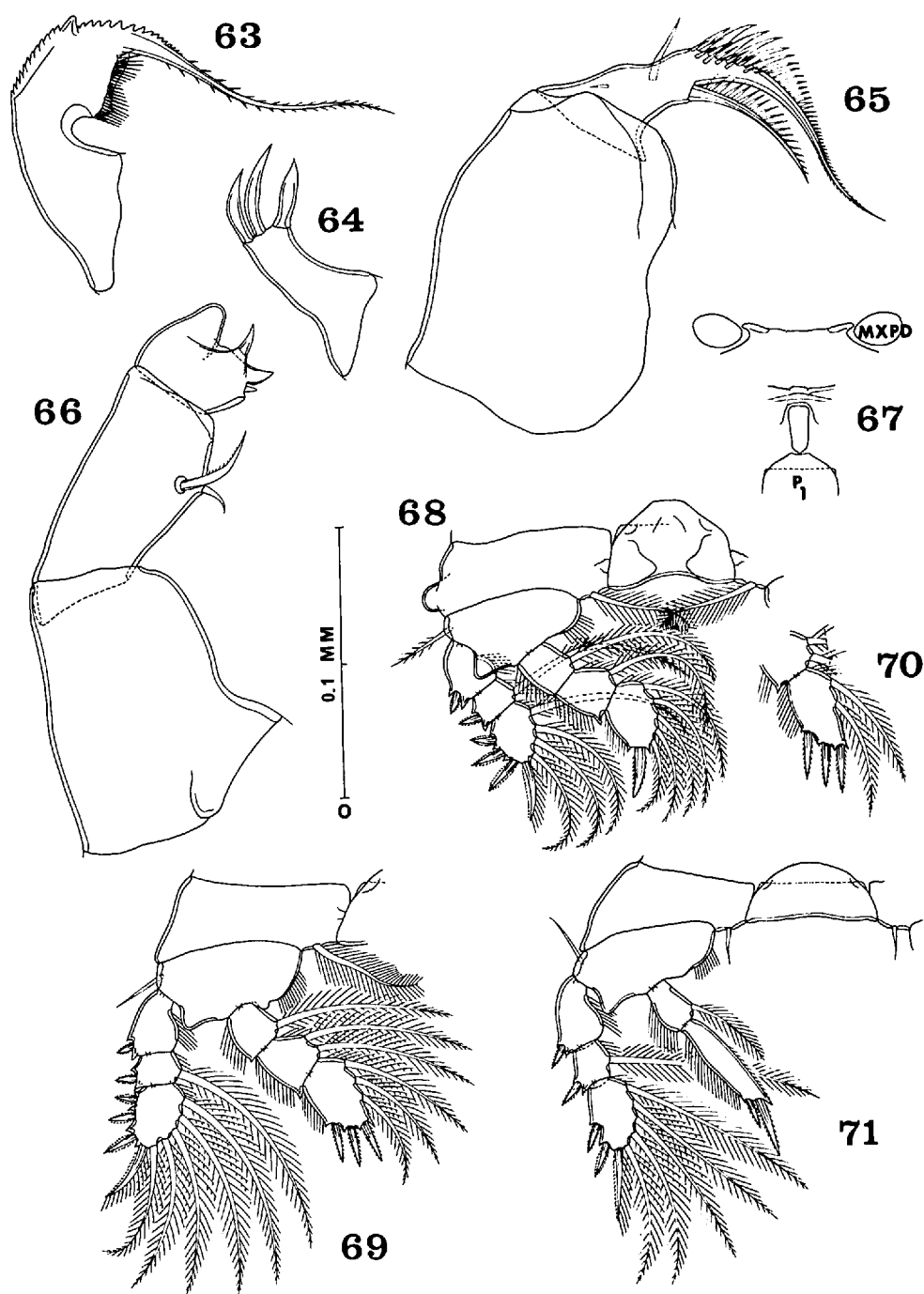
Rostrum (Fig. 59) broad with its posteroventral edge not well defined.

First antenna (Fig. 60) $572 \mu\text{m}$ long. Lengths of seven segments (measured along their posterior nonsetiferous margins): 57 ($114 \mu\text{m}$ along anterior margin), 212, 36, 75, 57, 47, and $31 \mu\text{m}$ respectively. Formula for armature as in *Anisomolgus limbatus*. All setae naked except one on fifth segment and four on seventh segment which are haired.

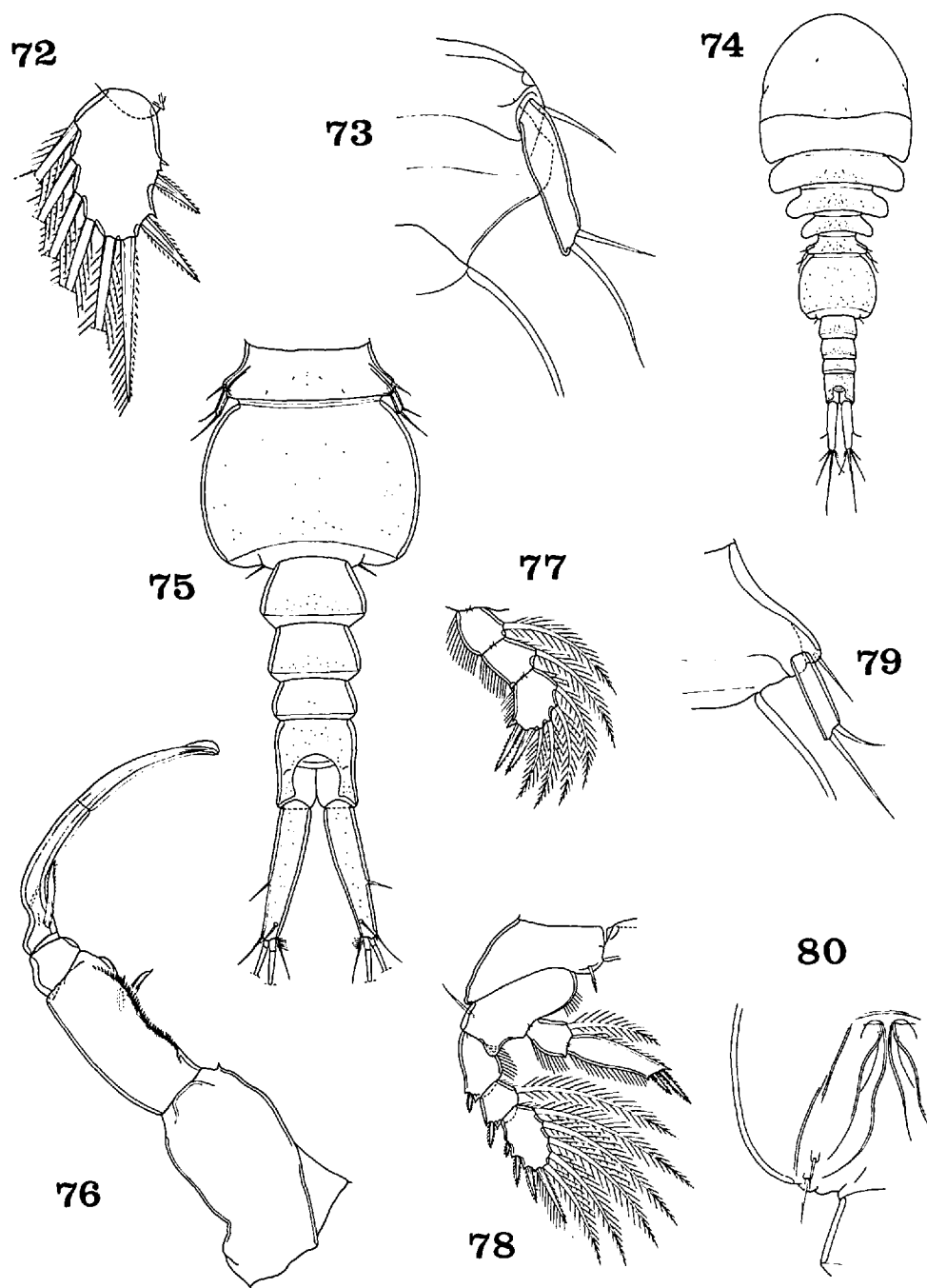
Second antenna (Fig. 61) $407 \mu\text{m}$ long including claw, segmented and armed as in other species of *Paramolgus*. Fourth segment $122 \mu\text{m}$ along outer edge, $86 \mu\text{m}$ along inner edge, and $38 \mu\text{m}$ wide. Claw $62 \mu\text{m}$ along axis. All setae naked.

Labrum (Fig. 62) with two posteroventral lobes.

Mandible (Fig. 63) having on convex side of base a scalelike area with a row of spinules followed by a prominent tooth and a dentate fringelike area; concave side of base distal to indentation with row of slender spinules. Lash long and barbed. Paragnath (Fig. 62) a small lobe with a few hairs. First maxilla (Fig. 64) with three broad elements. Second maxilla (Fig. 65) with large unornamented first segment. Second segment elongate, bearing on its posterior surface a smooth seta, on its inner edge a large seta with unilateral spinules, and on its proximal anterior surface a small setule; lash long with row of graduated spines along outer



Figures 63–71. *Paramolgus inconstans*, n. sp., female: 63, mandible posterior (scale 0); 64, first maxilla, posterior (0); 65, second maxilla, anterior (0); 66, maxilliped, postero-inner (0); 67, area between maxillipeds and first pair of legs, ventral (K); 68, leg 1 and intercoxal plate, anterior (M); 69, leg 2, anterior (M); 70, third segment of endopod of leg 3, anterior (M); 71, leg 4 and intercoxal plate, anterior (M).



Figures 72–80. *Paramolgus inconstans*, n. sp. Female: 72, third segment of exopod of left leg 4, anterior (scale L); 73, leg 5, ventral (L). Male: 74, dorsal (J); 75, urosome, dorsal (K); 76, maxilliped, inner (N); 77, endopod of leg 1, anterior (M); 78, leg 4, anterior (M); 79, leg 5, ventral (L); 80, leg 6, ventral (M).

edge and two rows of slender spines at proximal end of this row. Maxilliped (Fig. 66) 3-segmented. First segment unarmed, second segment with two unequal inner setae, and third segment terminally from outer to inner with a large blunt lobe, a spine, a spiniform process, and a short spinule.

Ventral area between maxillipeds and first pair of legs (Fig. 67) not protuberant.

Legs 1–4 (Figs. 68–71) segmented and armed as in other species of genus. Coxa of leg 1 with outer lobe. In leg 4 inner coxal seta $35\text{ }\mu\text{m}$ and smooth. Exopod $180\text{ }\mu\text{m}$. First segment of endopod $49 \times 36\text{ }\mu\text{m}$, its inner plumose seta $94\text{ }\mu\text{m}$. Second segment $120\text{ }\mu\text{m}$ including spiniform process, $109\text{ }\mu\text{m}$ without process, and $29\text{ }\mu\text{m}$ in greatest width. Two terminal barbed spines $33\text{ }\mu\text{m}$ (outer) and $55\text{ }\mu\text{m}$ (inner). Outer margin of both segments haired and inner margin of second segment with delicate spinules. In one female left third exopod segment showing an incipient third lateral spine (Fig. 72), suggesting formula of III, I, 5; exopod on right side II, I, 5 as in Figure 71.

Leg 5 (Fig. 73) with elongate unornamented free segment inserted ventrally, $75 \times 17\text{ }\mu\text{m}$, ratio 4.41:1. Two terminal setae $60\text{ }\mu\text{m}$ and $34\text{ }\mu\text{m}$. Dorsal seta $40\text{ }\mu\text{m}$. All setae naked.

Leg 6 represented by two setae and spiniform process on genital area (Fig. 57).

Living specimens in transmitted light grayish, eye red.

Male.—Body (Fig. 74) with prosome more evenly rounded anteriorly than in female. Length (without setae on caudal rami) 1.88 mm (1.81 – 1.92 mm) and greatest width 0.63 mm (0.61 – 0.66 mm), based on four specimens in lactic acid. Ratio of length to width of prosome 1.43:1. Ratio of length of prosome to that of urosome 1.01:1.

Segment of leg 5 (Fig. 75) $78 \times 260\text{ }\mu\text{m}$. Genital segment $242 \times 319\text{ }\mu\text{m}$, wider than long. Four postgenital segments from anterior to posterior $94 \times 153\text{ }\mu\text{m}$, $81 \times 139\text{ }\mu\text{m}$, $55 \times 126\text{ }\mu\text{m}$, and $133 \times 124\text{ }\mu\text{m}$.

Caudal ramus resembling that of female but shorter, $221 \times 44\text{ }\mu\text{m}$, ratio 5.02:1 (Fig. 75).

Body surface with few hairs and scattered refractile points.

Rostrum similar to that of female.

First antenna resembling that of female but three aesthetes added (at points indicated by dots in Figure 60). Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla as in female. Maxilliped (Fig. 76) with minute spiniform process on inner distal area of first segment. Second segment with two inner setae, one smooth, other barbed, and row of spinules. Third segment unarmed. Claw $200\text{ }\mu\text{m}$ including terminal lamella, showing proximally on convex margin a pronounced indentation and on outer surface an oblique sclerotization. Two proximal setae on claw unequal, larger seta barbed.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented and armed as in female, except for third segment of endopod of leg 1 (Fig. 77) where formula is I, I, 4 instead of I, 5 as in female. In one male third exopod segment of leg 4 with formula III, I, 5 on both sides (Fig. 78); other three males with this segment II, I, 5. In male of Figure 78 terminal spine of third exopod segment of right leg 4 with outer hairs and inner barbs, reverse of usual ornamentation; left leg in this male with this spine having usual outer barbs and inner hairs. Inner coxal seta with few small barbules.

Leg 5 (Fig. 79) with free segment $42 \times 13\text{ }\mu\text{m}$, its two terminal setae $52\text{ }\mu\text{m}$ and $26\text{ }\mu\text{m}$. Dorsal seta $29\text{ }\mu\text{m}$.

Leg 6 (Fig. 80) consisting of posteroventral flap on genital segment bearing two naked setae $31\text{ }\mu\text{m}$ and $49\text{ }\mu\text{m}$.

Spermatophore not seen.

Color in living specimens resembling that of female.

Etymology.—The specific name *inconstans*, Latin meaning inconstant or changeable, alludes to the variability in the armature of the third exopod segment of leg 4.

Comparison with Other Species of Paramolgus.—Thirteen species of *Paramolgus* are distinguishable from *Paramolgus inconstans* on the basis of their body length in the female (less than 2 mm). The fourteenth species, *Paramolgus clavatus* (Humes and Ho, 1968), has a body size comparable to the new species, but differs from it notably in the shape of the female genital segment and in the form of the second maxilla.

The shape of the genital segment in the female, coupled with the large body size and the elongate female caudal ramus (4.49:1), will serve to separate *Paramolgus inconstans* from the 14 species presently assigned to this genus.

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